Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

AEP
INDIANA
MICHIGAN
POWER

April 10, 1997

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating Licenses DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

97-001-00

Sincerely,

A. A. Blind
Site Vice President

/mbd

Attachment

c: A. B. Beach, Region III
E. E. Fitzpatrick
P. A. Barrett
S. J. Brewer
M. R. Padgett
D. Hahn
Records Center, INPO
NRC Resident Inspector

IE22 1/1

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9704160170 DOC.DATE: 97/04/10 NOTARIZED: NO DOCKET #
FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana M 05000316
AUTH.NAME AUTHOR AFFILIATION
FARLOW,S. American Electric Power Co., Inc.
BLIND,A.A. American Electric Power Co., Inc.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-001-00:on 970311,automatic reactor trip signal initiated by reactor protection sys.Caused by failure of controller for 2-FRV-210,due to static discharge.Taylor controller for 2-FRV-210 replaced.W/970410 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 4
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-3 PD	1	1	HICKMAN,J	1	1
INTERNAL:	AEOD/SPD/RAB	2	2	AEOD/SPD/RRAB	1	1
	FILE CENTER	1	1	NRR/DE/ECGB	1	1
	NRR/DE/EELB	1	1	NRR/DE/EMEB	1	1
	NRR/DRCH/HHFB	1	1	NRR/DRCH/HICB	1	1
	NRR/DRCH/HOLB	1	1	NRR/DRCH/HQMB	1	1
	NRR/DRPM/PECB	1	1	NRR/DSSA/SPLB	1	1
	NRR/DSSA/SRXB	1	1	RES/DET/EIB	1	1
	RGN3 FILE 01	1	1			
EXTERNAL:	L ST LOBBY WARD	1	1	LITCO BRYCE,J H	1	1
	NOAC POORE,W.	1	1	NOAC QUEENER,DS	1	1
	NRC PDR	1	1	NUDOCS FULL TXT	1	1

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL DESK (DCD) ON EXTENSION 415-2083

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 24 ENCL 24

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	Page 1 of 4
Donald C. Cook Nuclear Plant - Unit 2	50-316	

TITLE (4)
Unit Trip Due to Low Level Coincident with Steam Flow/Feed Flow Mismatch Due to Controller Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	11	97	97	-- 001 --	00	04	10	97	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71©
	20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)		OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
	20.2203(a)(2)(iv)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
	20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Mr. Stan Farlow, I&C Engineering Supervisor	616/465-5901, x2858

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 11, 1997 at 1056 hours with Unit 2 at 100 percent Rated Thermal Power, an automatic reactor trip signal was initiated by the Reactor Protection System (RPS). The trip signal resulted from a #21 Steam Generator (SG) low level coincident with a Steam Flow/Feed Flow mismatch. An unplanned ESF actuation consisting of a second automatic start of the Turbine Driven Auxiliary Feedwater Pump (TDAFP) also occurred. This event is reportable in accordance with 10CFR50.73(a)(2)(iv) as an event that resulted in the automatic actuation of Engineered Safety Features (ESF), including the Reactor Protection System (RPS).

This event was caused by the failure of the controller for 2-FRV-210, due to static discharge. The controller for 2-FRV-210, a Taylor MOD 30, was replaced with a newly configured controller. Corrective Actions were completed for all Unit 2 Taylor controllers prior to restart.

No safety systems were out of service prior to the trip. After the reactor trip, all safety systems operated as designed. Normal off-site power was available and an automatic transfer to this source occurred after the Main Generator trip. This event was determined to have no safety significance, and to have no potential or actual effect on the health and safety of the public.

Conditions Prior to Event
Unit 2 was in Mode 1 at 100 percent Rated Thermal Power.

Description of Event
On March 11, 1997 at 1056 hours with Unit 2 at 100 percent Rated Thermal Power, an automatic reactor trip signal was initiated by the Reactor Protection System (RPS). The trip signal resulted from a #21 Steam Generator (SG) low level coincident with a Steam Flow/Feed Flow mismatch.

Surveillance procedure **IHP 4030.SMP.216, "Steam Generator Level Protection Set II Functional Test and Calibration" was in progress. This surveillance requires that the controller for Feedwater Regulating Valve (FRV) 2-FRV-210, which provides feedwater flow to the #21 SG, be placed in manual. When the Reactor Operator (RO) carried out this action, the controller failed, and the FRV went closed. This closure resulted in all main feedwater to the #21 SG being shut off. Approximately fifteen seconds later, the level in the #21 SG reached the low level set point.

Following the reactor trip, the Main Turbine tripped and both Main Feed Pumps tripped. This resulted in the automatic start of both Motor Driven Auxiliary Feedwater Pumps (MDAFPs). The TDAFP automatically started after the level in two out of four SG's reached their low low level alarm set point. The TDAFP was secured and aligned for another automatic start in accordance with the reactor trip response procedure.

Fifty-three minutes after the reactor trip occurred, the TDAFP automatically started a second time. Because this was an unplanned ESF actuation, it is a reportable event. The logic for this automatic start was made up as follows: All SG's reached their low low level set points following the trip, which is a normal post-trip response. Level in #21 SG was the lowest of the four SG's since it had lost main feed flow prior to the trip. After the trip, all four SG's were appropriately supplied at approximately the same auxiliary feedwater flowrate. When sufficient feedwater had been supplied, the low low level alarm cleared on SGs #22, #23, and #24, which reset the TDAFP auto start circuit. As SG levels increased, small level oscillations occurred on all Sgs, which is a normal system response. One of these oscillations occurred soon after the low low level alarm cleared on #23 SG which resulted in another low low level alarm. This alarm in combination with the standing low low level alarm on #21 SG made up the logic to auto start the TDAFP. The TDAFP restarted and all associated feedwater valves opened as designed.

Cause of Event
The reactor trip was caused by the failure of the controller for 2-FRV-210 due to static discharge when touched by the RO. In accordance with the surveillance which was in progress, the RO was to place the controller in manual. When the controller was touched, the display went blank and the FRV immediately closed. This stopped all main feedwater flow to the #21 SG, and initiated the event. A post trip investigation determined that the controller was not properly grounded for the conditions that existed in the Control Room. This contributed to the controller's failure.

Valve 2-FRV-210 uses a Taylor MOD 30 controller. Taylor MOD 30 controllers have been installed in both units for the control of primary and secondary systems. The Taylor MOD 30 controllers were installed during refueling outages which ended in May and December of 1994 for Units 1 and 2 respectively. There had been a concern related to these controllers regarding their susceptibility to electrostatic discharge when touched.

In response to this concern, corrective actions had been identified and scheduled but not yet completely implemented. Some of these identified corrective actions were performed on-line. Others could not be performed with the units in Modes 1 or 2, and were scheduled to be performed at the earliest opportunity.

Cause of Event (cont'd)

The ESF actuation involving the second start of the TDAFP had several contributing factors which together caused the event. The contributors were the loss of main feedwater to #21 SG prior to the trip, securing of the TDAFP, the deadband on the SG low low level alarm bistables, and the normal post trip SG level indication oscillations. Although unplanned, the ESF actuation occurred as designed when the initiating conditions were met.

Analysis of Event

This event is reportable in accordance with 10CFR50.73(a)(2)(iv) as an event that resulted in the automatic actuation of Engineered Safety Features (ESF), including the Reactor Protection System (RPS).

In response to the reactor trip signal, all control rods fully inserted and the Main Turbine tripped. Tripping of the Main Turbine caused both Main Feed Pumps to trip and subsequently both MDAFPs started. The TDAFP started after the low-low level occurred in 2 out of 4 SGs. It was secured and aligned for automatic start in accordance with the reactor trip response procedure.

No safety systems were out of service prior to the trip. The post reactor trip review verified that all safety systems operated as designed. Normal off-site power was available and an automatic transfer to this source occurred after the Main Generator trip. All systems functioned as required with the exception of the Main Turbine Turning Gear Motor which emitted smoke and sparks upon being energized after the turbine tripped.

This event was determined to have no safety significance, and to have no potential or actual effect on the health and safety of the public.

Corrective Actions

The following actions were completed in Unit 2 prior to restart:

- The Taylor Controller for 2-FRV-210 was replaced with a newly configured controller.
- The Main Turbine Turning Gear motor was replaced.
- All scheduled Taylor Mod 30 corrective actions were completed to address susceptibility to electrostatic discharge on those controllers which could not be worked on-line. These corrective actions included installing Static Drain Clips and ground wires from the controllers to the plant ground system.

The following actions have been completed in both Units:

- As an interim measure, anti-static shoe straps are being worn by all Control Room Operators while working at the Control Boards.
- New chairs were installed in the Control Rooms on April 3, 1997. These chairs have an electrostatic discharge feature to help prevent the buildup of electrostatic charge by the operators.

Corrective Actions (cont'd)

The following actions will be completed in Unit 1 prior to finishing the current refueling outage:

- All scheduled Taylor Mod 30 corrective actions will be completed to address susceptibility to electrostatic discharge on those controllers which could not be worked on-line. These corrective actions include installing static drain clips and ground wires from the controllers to the plant ground system.

Regarding the unplanned ESF actuation, corrective actions are still under consideration. An engineering review of the SG low low level alarm instrument deadband will be performed before the next scheduled calibration surveillance of the associated instruments to determine if any additional actions are necessary.

Failed Component Identification

Component Name: 2-RU-8, Feedwater Regulating Valve Controller
Manufacturer: Kent-Taylor
Model: XL-170
EIIS Code: JB-PDC

Previous Similar Events

315/96-002-00